Original Research

Cross-Cultural Adaptation and Initial Validation of Mi Niño: A Tool to Measure Food-Related Parenting Practices of Spanish-Speaking Parents with Young Children

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ABSTRACT

Background: Accurate measurement of food-related parenting practices is necessary to inform related interventions and program evaluation. Valid tools reflect cultural attributes that affect household food environments and feeding practices. Simple, unidirectional language adaptation approaches are insufficient to capture these attributes in assessment tools. My Child at Mealtime (MCMT) is a 27-item, validated, visually enhanced self-assessment tool to measure food-related parenting practices of low-income English-speaking parents of preschoolers.

Objectives: The aim of this study was to describe the cross-cultural adaptation of MCMT into its Spanish version *Mi Niño a la Hora the Comer* (Mi Niño) and to establish its face validity, factor structure, and internal consistency.

Methods: MCMT was adapted into its Spanish version after an iterative process that triangulated cognitive interviews with verification of conceptual equivalence by content experts to establish face validity and semantic equivalence. The resulting tool underwent confirmatory factor analysis to determine whether internal consistency was equivalent across the 2 versions.

Results: Four rounds of cognitive interviews ($n = 5$, $n = 6$, $n = 2$, and $n = 4$, respectively) with Spanish-speaking women caregivers of children aged 3–5 y recruited from Head Start were conducted. Ten items were modified throughout the adaptation process. Modifications included improved clarity (6 items), comprehension (7 items), appropriateness (4 items), suitability (4 items), and usefulness (2 items) of text and/or accompanying visuals. Confirmatory factor analysis with a sample of Spanish-speaking caregivers ($n = 243$) resulted in 2 reliable factors representing "child-centered" ($\alpha = 0.82$) and "parent-centered" ($\alpha = 0.87$) food-related parenting practices.

Conclusions: Face validity, semantic equivalence, and internal consistency of Mi Niño were established. This tool can be used in community settings to inform program content and measure changes in food-related parenting practices of Spanish-speaking parents and assist in setting food-related parenting goals. The next steps include exploring the correspondence of Mi Nino with mealtime behaviors observed through video recording.

Keywords: parenting, home food environment, measurement, Spanish, validity, reliability, cross-cultural, language adaptation

Introduction

Parents and caregivers influence children's food choices and nutritional status through food-related parenting practices that shape the food environment and eating practices at home [1, 2]. However, structural disparities may prevent parents from affording healthy food environments [3]. For instance, Latino children are more likely than their non-Hispanic white counterparts to be overweight and be raised in household environments marked by food insecurity [4, 5]. These nutrition inequities are more acute among Latino children from households in socioeconomic disadvantage [6, 7]. Accurate measurement of eating and food-related parenting practices of low-income Latino families in the United States is critical to sensibly addressing these inequities.

Assessments of household dietary behaviors of US Spanish-speaking Latino families must be sensitive to the cultural

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framework of the respondents. This is especially relevant for family-based processes, such as parenting, because family practices are deeply bound by cultural beliefs and values [8, 9]. Food-related parenting practices have been found to be important determinants of dietary behaviors in early childhood [10–13]. These practices include parent-centered and child-centered behaviors. Parent-centered behaviors are organized around the needs of the parent and are characterized by the use of coercive control behaviors (e.g., restriction, pressure, and threats). Conversely, child-centered behaviors are organized around the needs of the child and are characterized by the use of autonomy-promoting behaviors (e.g., reasoning and encouragement). In addition, the expression of food-related parenting behaviors may be culturally constructed. Time constraints, affordability, availability of nutritious food, and food waste aversion are additional factors that have been identified as affecting the food choices and nutritional status of low-income Latino households [3, 7, 14, 15]. Moreover, Latino children of immigrant families that retain traditional eating patterns tend to have diets of higher quality than children from families with more acculturated eating patterns [16, 17]. This difference is paradoxically attenuated by parent education [17–19]. Thus, interventions to promote diet quality in Latino children, including preserving favorable traditional behaviors, must consider the socioeconomic and cultural attributes that inform food-related parenting practices [15, 20]. One avenue to accomplish this is using valid and culturally responsive assessment tools to guide interventions.

Spanish-speaking families compose a significant percentage of the Latino population in the United States [21]. After English, Spanish is the language most commonly spoken in US households (13.4%) [22]. About 45% of those who speak Spanish at home are foreign-born, and 40% have limited ability to speak English [23]. Spanish-speaking subgroups express distinctive food-related choices, traditions, and vocabulary reflective of their country or region of origin [24]. These cultural expressions can affect the interpretation of food and dietary terminology, which can have consequences on the measurement of eating behaviors and practices.

Simple, top-down approaches—such as forward translations—are common practice when adapting assessment tools into another language. However, standards for cross-cultural adaptation emphasize corroborating content equivalence, centering the target respondent as a source of expert input [25]. The systematic engagement of the target respondent to ensure semantic accuracy of collected data is known as face validity [25, 26]. Demonstrating face validity is particularly key for self-administered tools, for which averting misinterpretation (i.e., item functioning bias) through clarification is impractical [25]. The process of establishing face validity involves exploring the extent to which a tool retains its meaning when adapted for use with a particular cultural or linguistic group. The process is made robust when target respondent input is systematically coupled with the appraisal of conceptual equivalence by content experts. Other dimensions of equivalence are further explored through quantitative methods such as a factor analysis (i.e., construct equivalence) [25, 27].

My Child at Meal Time (MCMT) is a 27-item tool to measure food-related practices of parents of 3- to 5-y-old children [28]. The tool was created based on the Caregiver's Feeding Styles Questionnaire (CFSQ) [29] and incorporated additional items to measure mealtime structure and routines. MCMT was designed to be self-administered and to reduce cognitive burden. This was achieved by simplifying text and accompanying each item with a photograph depicting the evaluated behavior. Pairing text with evocative images has been shown to improve comprehension and lower cognitive demand [30]. MCMT was tested for face and construct validity with a sample of low-income, ethnically diverse, English-speaking parents [28, 31]. Moreover, MCMT was developed to be used along with Healthy Kids, a tool to assess child obesity risk in the home environment [32–34]. The purpose of this study was to adapt MCMT into *Mi Niño a la Hora de Comer* (Mi Niño), testing its face validity, semantic equivalence, factor structure, and internal consistency to determine its accuracy and consistency in measuring food-related parenting practices of low-income, Spanish-speaking parents with young children.

Methods

This study was part of a larger project called *Niños Sanos*, which assessed pediatric obesity risk in the context of the home environment and dietary behaviors of low-income, Spanish-speaking families with preschool-aged children [34]. Potential participants were invited to the study during information meetings at Head Start and the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) in a metropolitan area in Northern California. Parents were included if they were enrolled in Head Start or were current WIC recipients, spoke Spanish as their primary language, and had a child between the ages of 3 and 5 y. Informed consent was obtained from all participants following a standard protocol that included using plain, simple language to describe the study's purpose, activities, and length, risks and benefits, and how to report concerns or ask questions about the study. Participants received $10 for participating in a cognitive interview and $25 for completing Mi Ni1o, a home food environment tool, and a demographic survey. The study protocol (ID #693978-14) was approved by the Institutional Review Board, University of California, Davis, CA.

Face validity and semantic equivalence

An iterative adaptation process comprising forward translation, expert equivalence verification, and cognitive interviews with target respondents was followed to establish face validity and semantic and conceptual equivalence of Mi Niño (Figure 1). Following readability principles and guidelines [35], each of the 27 items and response scales of MCMT were forward translated by 2 bilingual and bicultural researchers in collaboration with a native Spanish-speaking registered dietitian (Figure 1, component 1). To ensure the content remained stable on translation, the registered dietitian and a child development psychologist examined translated items for conceptual equivalence (Figure 1, component 2) and revised accompanying visuals for appropriateness. Then, the translated and expert-verified tool was used in cognitive interviews with target respondents (Figure 1, component 3).

Trained bilingual researchers conducted in-person cognitive interviews in Spanish applying standard techniques—think aloud, paraphrasing, and verbal probing [36,37]. As summarized in Table 1, cognitive interview questions evaluated items on 4
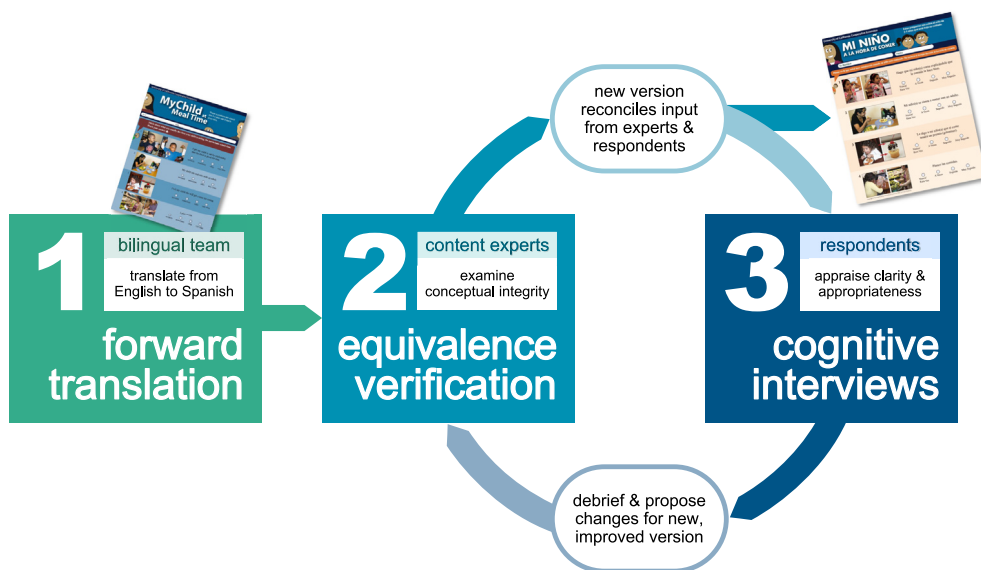
FIGURE 1. Three-Component Iterative Cross-cultural Adaptation Model used to establish the face validity of Mi Niño, the Spanish version of My Child at Meal Time. The 3 components include the following: (1) forward translation of the original tool, (2) equivalence verification by content experts, and (3) cognitive interviews with target respondents. Item modifications to text and accompanying visuals were made iteratively based on feedback from experts and target respondents.

core domains: *1*) *clarity* of words and syntax; *2*) *comprehension* as the ability to react to an item as intended; *3*) *appropriateness* of words (i.e., conceptual semantics); and *4*) semantic *equivalence* to MCMT from the perspective of bilingual respondents [38].

Two more domains explored the accompanying visuals: *5*) *suitability* for reflecting respondent's context and practices (i.e., appropriateness) and *6*) their *usefulness* for understanding the concept being measured (i.e., comprehension). Immediately

TABLE 1

Cognitive interview protocol with questions and respective domains

Questions	Domain
1. *¿Me podría leer la pregunta en voz alta?* Could you please read the question aloud?	Clarity
2. *¿Cómo contestaría esta pregunta? ¿Por qué?* How would you respond to this question? Why?	Comprehension
3. *Para usted, ¿a qué se refiere esta pregunta?* What is this question about?	Comprehension
4. *¿Me podría describir cómo sucede una situación como esta en su casa?* Could you describe how this scenario look like in your household?	Appropriateness
5. *¿Cree que la pregunta es clara?* In your opinion, is this question clear?	Clarity
6. *¿Cambiaría usted alguna de las palabras?* Are there any words that you would change?	Appropriateness
7. *¿Como haría esta pregunta en sus propias palabras?* How would you say this question using your own words?	Clarity
8. *¿Cuál versión de la pregunta le parece mejor?* [a] What version of the question is better?[1]	Appropriateness
9. *¿Sabe si otros padres que hablan español hacen esto (lo que se pregunta)?* Do other Spanish-speaking parents you know do this?	Appropriateness
10. *¿Cómo mejoraría la pregunta para que otros padres la entendieran mejor?* How can this question be more understandable to other parents?	Clarity
11. *¿Se pregunta lo mismo en la versión en español que en la versión en inglés?* Does the Spanish version ask the same as the English version?	Equivalence[2]
12. *¿Qué palabras cambiaría para preguntar lo mismo que en la versión en inglés?* What words would you change to ask the same as in the English version?	Equivalence[2]
13. *¿Me podría describir lo que sucede en la foto?* Can you please describe the situation in the photo?	Suitability[3]
14. *¿Cree que la imagen representa la pregunta?* In your opinion, does the photo represent the question asked?	Usefulness[3]
15. *¿Le parece que la foto ayuda a entender la pregunta?* Do you think the photo helps understand the question?	Usefulness[3]
16. *¿Qué otras imágenes o fotos irían mejor con la pregunta?* What other images or photos would better represent the question?	Suitability[3]

[1] Question asked when 2 or more versions of an item need to be presented to the participant.

[2] Questions on the Equivalence domain are asked showing both, the Spanish and English versions of the tool to bilingual respondents.

[3] Suitability and Usefulness domains are explored for accompanying visuals.

after each round of cognitive interviews, researchers debriefed about the items found problematic according to participants' feedback and proposed modifications to improve them. Content experts reviewed the proposed modifications (Figure 1, component 2) and determined which to implement in a new version of the tool following guidelines offered by Knafl et al. [39]. This included summarizing respondent interpretation of items and identifying problematic items within each domain of interest. Each modified version was tested in a subsequent round of cognitive interviews with a new set of participants (Figure 1, component 3). When 2 or more versions of an item were deemed appropriate, all versions were presented to participants to gauge their preference (Table 1, question 7). Components 2 and 3 were iterated until no further changes were needed, at which point a final version was attained. Respondent feedback, debriefing notes, expert comments, and item modifications were documented for each iteration in a Microsoft Excel spreadsheet.

Factor analysis

The resulting Mi Niño tool was administered to 243 Spanish-speaking parents recruited into the *Niños Sanos* study ($n = 243$). Most of them were married (63.0%) mothers (95.5%) who identified as Hispanic (98.8%) of Mexican or Central American origin (86.4%) and have lived in the United States for >10 y (79.8%). Almost half of the respondents (48.6%) had completed high school (27.6%) or obtained at least some college education (21.0%), whereas 41.6% had less than high school education. Administration of the Mi Niño tool followed the same protocol reported for MCMT [31]. Parents were told to focus on a child at home between the ages of 3 and 5 y when completing the Mi Niño items. If there was more than 1 child in the 3–5 y age range in the home, parents were asked to select one of those children as the focal child for their answers. Parents were told they could ask questions about any of the items as needed. The reliability of Mi Niño was evaluated in 2 ways. First, the distribution of responses for all items was assessed to determine whether responses were well distributed across response options. Second, to test whether the tool aligns with the 2-factor "child-centered" and "parent-centered" structure found for MCMT, a confirmatory factor analysis was conducted using a structural equation modeling framework with Rstudio Version 1.0.153 software (Rstudio Team, 2015) using the "CFA" function with maximum likelihood estimation in the lavaan package. Then, the Cronbach coefficient α's were examined to determine whether the resulting factors had reasonable reliability to be retained as scale scores.

Results

Face validity and semantic equivalence

Four iterations of the adaptation process were conducted with 17 participants ($n = 5$, $n = 6$, $n = 2$, and $n = 4$, respectively). Most participants ($n = 15$) were native Spanish-speaking women born in Mexico or Central America; 2 were born in the United States and were bilingual in English and Spanish, and all participated in at least 1 USDA assistance program. As presented in Table 2, 10 items of the 27 in the tool underwent modifications as a result of the adaptation process. Three of the 10 items (items 4, 9, and 10) were deemed acceptable by target respondents and experts after 2 iterations of the process, 6 items

(items 3, 12, 14, 15, 17, and 24) after 3 iterations, and 1 item after 4 iterations (item 7). Figure 2 shows an example of the adaptation process applied to one of the items in the tool.

Most items were modified to improve clarity and/or comprehension (Table 2). Clarity improvements involved removing distracting or unnecessary words, such as the abbreviation "*ej.*" (Spanish for "e.g.") and the first-person pronoun "*yo.*" Text changes to improve comprehension included sentence revision and underlining key information for emphasis. Respondents' response to item 14 "I struggle with my child to get her to eat (pick her up and put her in the chair)," indicated a need to add the word "*físicamente*" to the sentence to increase comprehension of the concept being evaluated. Other gains in comprehension were achieved by improving the usefulness of accompanying visuals. Item 7, "I prepare at least one food that I know my child will eat," required 4 rounds of cognitive interviews to be deemed understandable. After futile probing of a simplified version of the text, comprehension was ultimately achieved by replacing the image of a parent preparing a child's plate from different cooked dishes with an image of a parent and a child sitting at a table with various dishes displayed.

Four items were modified for appropriateness by incorporating respondent-preferred terminology and more useful or suitable visuals. The noun "treat," as applied to food, has no direct morphologic equivalent in Spanish. The word with the closest meaning is "*golosina.*" However, the meaning of the word "*golosina*" is less encompassing (i.e., commonly refers to "candy") than that of the word "treat." Thus, experts determined it was more fitting to use the word "*golosina*" as an example—not as part of the sentence as in MCMT—in item 3 "I tell my child she will get a treat for eating" and item 15 "I warn my child he will not get a treat if he does not eat." To elicit further comprehension, these changes to the text were coupled with changes to accompanying visuals that entailed using a modified version of an image of a cupcake used in another item in place of a photograph of a child eating a pastry. Some types of pastries (i.e., *pan dulce*) are commonly eaten as part of a meal and, thus, not consistently considered treats. Respondents agreed that the word "*golosina*" worked better as an example and that the cupcake visual helped to understand the items. In addition, item 12, "My child eats a snack at about the same time every day," was revised for semantic appropriateness. The word "snack" has no direct morphologic equivalent in Spanish. Terms used for the concept of "snack" vary widely between and within Spanish-speaking subgroups and can depend on the type of food (e.g., *colación, bocadillo, aperitivo, picada,* and *botana*) and eating occasion (e.g., *merienda, refrigerio, tentempié, entre comida,* and *bocas*). Because there was no agreement among respondents on the most appropriate term to use, experts recommended probing whether respondents knew the meaning of the word "snack." The word in English was retained because respondents demonstrated a reasonable understanding of its meaning. Respondents recommended adding a picture of a child eating a salty snack to expand the visual representation of snack variety. Finally, the appropriateness of item 24, "I tell my child that I will reward her for eating with TV, playtime, or videogames," was improved by replacing the image of a television with that portraying a child using a tablet.

Improving the suitability of accompanying visuals was the only modification made on 2 items. Many parents indicated it was uncommon for them to portion and freeze food for later use.

TABLE 2

Results of the application of the 3-Component Iterative Cross-Cultural Adaptation Model to face validate Mi Niño by item, modification, and corresponding domain

Item		Modification	Domain					
			Cl	Co	Ap	Eq	Su	Us
3	*Le digo a mi niño(a) que si come tendrá un premio* I tell my child she will get a treat for eating	Add "*(ej. golosinas)*"		●	●			
	Le digo a mi niño(a) que si come tendrá un premio (ex. golosinas) I tell my child she will get a prize for eating (e.g., treat)	Remove "*ej.*"	●					
4	*Planeo las comidas* I plan meals	Replace photograph of a parent food-portioning for storage with 1 of the parent looking at coupons					●	
7	*Preparo por lo menos un alimento que se que mi niño(a) se va a comer* I prepare at least one food that I know my child will eat	Remove "*se que*"	●					
	Preparo por lo menos un alimento que se va a comer mi niño I prepare at least one food that my child will eat	Revert to original version		●				
	Preparo por lo menos un alimento que se que mi niño(a) se va a comer I prepare at least one food that I know my child will eat	Replace photograph of parent serving a plate from various dishes with various foods offered at table						●
9	*Yo ayudo a mi niño(a) a comer (cortando la comida, enfriando la comida)* I help my child with eating (cut food, cool the food)	Remove "*Yo*"	●					
10	*Logro que mi niño(a) coma haciendo divertidos los alimentos* I get my child to eat by making food fun	Make photograph of veggies arranged as smiley-face less prominent					●	
12	*Mi niño(a) se come un snack casi a la misma hora todos los días* My child eats a snack at about the same time everyday	Replace "snack" with "*bocadillo*"			●			
	Mi niño(a) se come un bocadillo casi <u>a la misma hora</u> todos los días My child eats a snack at about <u>the same time</u> everyday	Revert to "snack" Underline "*a la misma hora*"			●			
		Add photograph of child eating salty snack			●			●
14	*Batallo con mi niño(a) para que coma (alzarlo(a) y ponerlo(a) en su silla)* I struggle with my child to get her to eat (pick her up and put her in the chair)	Add "*físicamente*" and "*ej.*"			●			
	Batallo físicamente con mi niño(a) para que coma (ej. alzarlo(a) y ponerlo(a) en su silla) I physically struggle with my child to get her to eat (e.g., pick her up and put her in the chair)	Remove "*ej.*"	●					
15	*Le advierto a mi niño(a) que si no come no tendrá un premio* I warn my child he will not get a treat if he does not eat	Add "*regularmente*" and "*(ej. golosinas)*"		●	●			
	Regularmente le advierto a mi niño(a) que si no come no tendrá un premio (ej. golosinas) I often warn my child he will not get a treat if he does not eat (e.g., junk food)	Remove "*regularmente*" and "*ej.*"	●					
17	*Le pido a mi niño(a) que escoja de entre platillos ya preparados* I ask my child to pick from foods already cooked	Replace "*ya preparados*" with "*que yo preparo*"			●			
	Le pido a mi niño(a) que escoja de entre platillos que yo preparo I ask my child to pick from foods I prepared	Replace photograph with one showing a child selecting homemade food					●	
24	*Le digo a mi niño(a) que lo(a) voy a premiar por comer con televisión, tiempo para jugar o videojuegos* I tell my child that I will reward her for eating with TV, playtime, or videogames	Add "*regularmente*"			●			
		Replace "*con televisión, tiempo para jugar o videojuegos*" with "*(ej. mas tiempo para jugar)*"			●			
	Regularmente le digo a mi niño(a) que si come lo(a) voy a premiar (ej. mas tiempo para jugar) I often tell my child that I will reward her for eating (e.g. more play time)	Remove "*regularmente*" and "*ej.*"	●					
		Replace photograph of TV with 1 of the children using a tablet						●

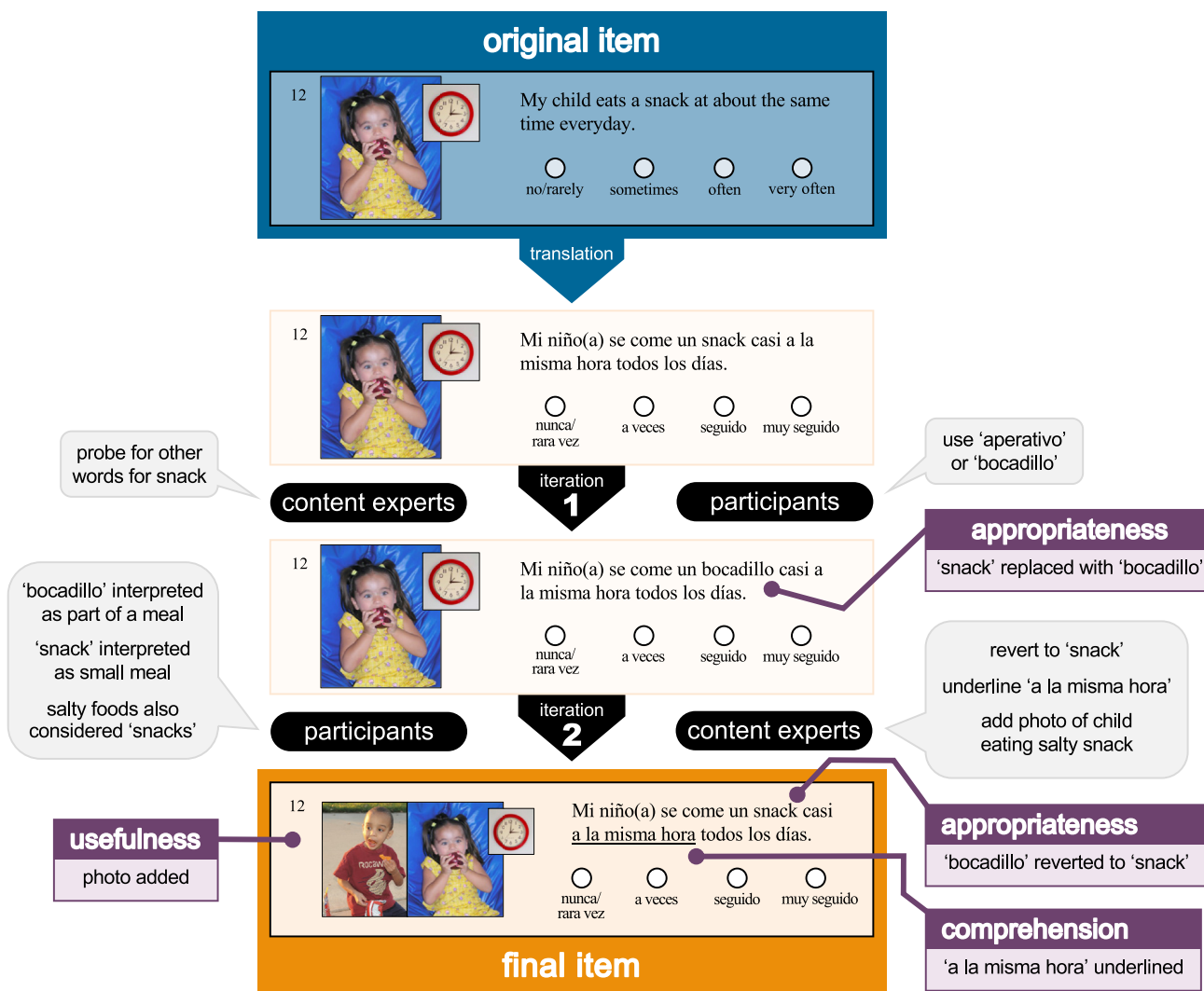Cl, clarity; Co, comprehension; Ap, appropriateness; Eq, equivalence; Su, suitability; Us, usefulness.

FIGURE 2. Example of the 3-Component Iterative Cross-Cultural Adaptation Model applied to adapt 1 of the items in My Child a Meal Time to its Spanish version in Mi Niño.

Thus, the image of a parent portioning meat in item 4, "I plan meals," was replaced with a photograph of a parent looking at a coupon page—a more familiar planning practice to respondents. On initial expert examination, modifications to the visual examples in item 10, "I get my child to eat by making food fun," were made, including making less prominent the photograph of a plate of vegetables arranged like a smiley face, removing the images of parents interacting with children during food shopping and preparation, and adding a photograph of a child drinking from a straw. Most respondents reacted favorably to the set of visual examples recommended by experts and corroborated visuals represented what they would do at home. Although a few participants indicated rarely offering vegetables arranged like a smiley face to their children, experts recommended retaining the picture because it was considered suitable by most participants and to maintain consistency with MCMT and CFSQ. Bilingual respondents identified no items needing changes to improve equivalence with MCMT.

Response distribution

Mean levels of individual item responses from the 243 participants who completed the resulting tool ranged from 1.30 to 3.73, with a minimum possible score of 1 for all items except for item 8 [*Felicito a mi niño(a) por comer*—"I praise my child for eating"] and a maximum score of 4 (Table 3). All items were well distributed and thus kept for further analyses. Item response frequency can be found as Supplemental Figure 1.

Confirmatory factor analysis

All individual Mi Niño items were significantly correlated with at least 1 other item ($r > 0.30$), suggesting reasonable factorability. The Bartlett test of sphericity ($\chi^2_{(351)}$: 2196.90, $P < 0.001$) and Kaiser–Meyer–Olkin measures of sampling adequacy (overall MSA: 0.84, individual item MSA > 0.60) indicated adequacy of the data for the factor analysis, except item 23 [*Dejo que mi niño(a) se sirva él(ella) mismo(a)*—"I let my child serve himself"], which had an individual MSA < 0.60. The

TABLE 3
Descriptive for individual Mi Niño item responses across the sample (*n* = 243)

Item		Min	Max	Mean (SD)
1	Hago que mi niño(a) coma explicándole que la comida le hace bien I get my child to eat by explaining that the food is good for him	1	4	3.12 (0.909)
2	Mi niño(a) se sienta a comer con un adulto My child sits and eats with an adult	1	4	3.73 (0.591)
3	Le digo a mi niño(a) que si come tendrá un premio (golosinas) I tell my child she will get a treat for eating	1	4	1.65 (0.850)
4	Planeo las comidas I plan meals	1	4	3.22 (0.913)
5	Le pido a mi niño(a) que pruebe un poco de un alimento nuevo I ask my child to try a little bit of a new food	1	4	3.00 (0.843)
6	Le recuerdo a mi niño(a) que siga comiendo su comida I remind my child to keep eating her food	1	4	2.74 (0.972)
7	Preparo por lo menos un alimento que se que mi niño(a) se va a comer I prepare at least one food that I know my child will eat	1	4	3.36 (0.706)
8	Felicito a mi niño(a) por comer I praise my child for eating	2	4	3.43 (0.728)
9	Ayudo a mi niño(a) a comer (cortando la comida, enfriando la comida) I help my child with eating (cut food, cool the food)	1	4	3.01 (0.942)
10	Logro que mi niño(a) coma haciendo divertidos los alimentos I get my child to eat by making food fun	1	4	2.24 (0.923)
11	Le digo a mi niño(a) que si no come estará en problemas (no juguetes, castigos) I tell my child he will get in trouble for not eating (no toys, time out)	1	4	1.65 (0.800)
12	Mi niño(a) se come un snack casi <u>a la misma hora</u> todos los días My child eats a snack at about <u>the same time</u> everyday	1	4	2.44 (0.836)
13	Mi niño(a) come su cena casi a la misma hora todos los días My child eats dinner at about the same time everyday	1	4	3.08 (0.783)
14	Batallo físicamente con mi niño(a) para que coma (alzarlo(a) y ponerlo(a) en su silla) I struggle with my child to get her to eat (pick her up and put her in the chair)	1	4	1.30 (0.616)
15	Le advierto a mi niño(a) que si no come no tendrá un premio (golosina) I warn my child he will not get a treat if he does not eat	1	4	1.48 (0.678)
16	Digo cosas buenas acerca de la comida que mi niño(a) esté comiendo I say good things about the food my child is eating	1	4	3.11 (0.836)
17	Le pido a mi niño(a) que escoja de entre platillos que yo preparo I ask my child to pick from foods already cooked	1	4	2.27 (0.909)
18	Le doy de comer en la boca a mi niño(a) para hacer que coma I hand-feed my child to ger her to eat	1	4	1.42 (0.674)
19	Le digo a mi niño(a), "Apúrate y come tu comida" I say to my child, "Hurry up and eat your food"	1	4	1.81 (0.756)
20	Le digo a mi niño(a) que necesita comerse algo de su plato ("Cómete tu pollo") I tell my child that she needs to eat an item on her plate ("Eat your chicken")	1	4	2.25 (0.841)
21	Le digo a mi niño(a) que no me gusta que no esté comiendo I tell my child I do not like it that he is not eating	1	4	1.87 (0.870)
22	Le hago preguntas a mi niño(a) acerca de los alimentos que esté comiendo I ask my child questions about the food she is eating	1	4	2.36 (0.822)
23	Dejo que mi niño(a) se sirva él(ella) mismo(a) I let my child serve himself	1	4	1.68 (0.692)
24	Le digo a mi niño(a) que si come lo(a) voy a premiar (mas tiempo para jugar) I tell my child that I will reward her for eating with TV, playtime, or videogames	1	4	1.85 (0.838)
25	La televisión esta prendida cuando mi niño(a) come A TV is on when my child eats	1	4	1.58 (0.698)
26	Mi niño(a) se salta comidas My child skips meals	1	4	1.43 (0.574)
27	Le ruego a mi niño(a) que se coma su comida I beg my child to eat his food	1	4	1.73 (0.896)

hypothesized 2-factor model and an alternative 1-factor model were tested through confirmatory factor analysis of the remaining 26 items. The maximum likelihood estimator and varimax rotation were both used for the final model (Table 4). The results showed stronger fit statistics for the 2-factor structure model [RMSEA (90% CI): 0.077 (0.070, 0.084); standardized root mean squared error (SRMR): 0.086; comparative fit index (CFI): 0.771; Tucker–Lewis index (TLI): 0.750] in comparison with those for the 1-factor model [RMSEA (90% CI): 0.145 (0.098, 0.111); SRMR: 0.115; CFI: 0.579; TLI: 0.542]. Overall, the factor

structure is consistent with the English version (MCMT) of this survey [28,31].

Internal consistency reliability

Consistent with the factor structure of MCMT [31], the first factor (13 items, Cronbach α = 0.816, item discrimination: 0.391; pBis: 0.678) considers child-centered strategies such as saying good things about the food being served and eating with the child. The second factor (13 items, Cronbach α = 0.867, item discrimination: 0.320; pBis: 0.675) captures parent-centered

TABLE 4
Confirmatory factor analysis in structural equation modeling framework for Mi Niño ($n = 243$)

Factor 1 (α = 0.82): child-centered strategies				Factor 2 (α = 0.87): parent-centered strategies			
Item	Standardized factor loading (SE)	Variance estimate	pBis	Item	Standardized factor loading (SE)	Variance estimate	pBis
1	0.59 (0.06)	0.54	0.48	3	0.55 (0.05)	0.46	0.51
2	0.28 (0.04)	0.16	0.30	6	0.65 (0.06)	0.63	0.58
4	0.36 (0.06)	0.33	0.36	11	0.66 (0.05)	0.53	0.60
5	0.52 (0.06)	0.44	0.46	14	0.40 (0.04)	0.25	0.39
7	0.55 (0.05)	0.39	0.53	15	0.62 (0.04)	0.42	0.61
8	0.55 (0.05)	0.40	0.48	18	0.58 (0.04)	0.39	0.55
9	0.53 (0.06)	0.50	0.46	19	0.58 (0.05)	0.44	0.54
10	0.60 (0.06)	0.56	0.53	20	0.69 (0.05)	0.58	0.63
12	0.39 (0.06)	0.32	0.39	21	0.74 (0.05)	0.64	0.67
13	0.31 (0.05)	0.25	0.36	24	0.62 (0.05)	0.51	0.56
16	0.71 (0.05)	0.59	0.62	25	0.32 (0.05)	0.22	0.33
17	0.46 (0.06)	0.42	0.41	26	0.32 (0.04)	0.19	0.32
22	0.63 (0.05)	0.52	0.53	27	0.68 (0.05)	0.60	0.64

All factor loadings were significant at $P < 0.001$. RMSEA (90% CI) = 0.077 (0.070, 0.084); SRMR = 0.086; CFI = 0.771; TLI = 0.750.
CFI, comparative fit index; pBis, point-biserial; RMSEA, root mean square error of approximation; SRMR, standardized root mean squared error; TLI, Tucker–Lewis index.

strategies such as using punishments or bribes to get the child to eat. All factor loadings were significant at $P < 0.01$ (Table 4).

Discussion

My Child at Meal Time (MCMT), a tool to measure food-related parenting practices [28], was adapted into *Mi Niño a la Hora de Comer* (Mi Niño) to be used with low-income, Spanish-speaking parents with young children. The adaptation process led to establishing face validity and semantic equivalence with MCMT. In addition, construct equivalence was explored, confirming that the items have a comparable factor structure with those of the English version, capturing child-centered and parent-centered food-related parenting strategies.

Robust tool testing is necessary to avert threats to internal validity in empirical studies and to obtain trustworthy data in practice [25,26]. Demonstrating that concepts are meaningful to the target respondent and correctly interpreted is particularly paramount for tools adapted for specific cultural and linguistic needs. Simple, top-down approaches to tool adaptation—such as forward and back translations—are economical but prone to eliciting bias when concepts of interest are systematically misinterpreted by the respondent [25, 40–42]. Hence, approaches that involve the target respondent to ascertain semantic equivalence are commonly recommended [25, 37, 43]. If the tool is to be used to make between-group comparisons, a process to ensure conceptual equivalence with the original version is also necessary [25, 44]. In this study, conceptual equivalence established by cognitive interviews was reinforced by replicating the internal factor structure of the English tool. Reports on the validation of tools to measure feeding practices are often limited to testing measurement and functional equivalence [45–48]. When methods to test face validity and semantic equivalence are described, the information provided is often insufficient to ascertain trustworthiness and to allow for replicability. For instance, with a few notable exceptions [39], domains tested in cognitive interviews are rarely defined and operationalized in face validation reports of tools to measure parent feeding practices. In addition, reported cross-cultural adaptation methods often consist of sequential approaches where tool modification

occurs unidirectionally [49, 50]. The iterative process applied to adapt MCMT into Mi Niño allowed for the tool's semantic accuracy to be improved with each instance of respondent-driven changes coupled with expert verification. To our knowledge, this is the first study that reports on the application of a cross-cultural adaptation approach that entails an iterative, operationalized-domain triangulation of cognitive interviews with expert equivalence verification to establish the face validity of a tool to measure food-related parenting practices.

Most of the needed changes identified in this study were in the domains of clarity and comprehension. Most of the improvements on these domains were achieved by revising the visual representation of the concept being evaluated—rather than the text—and it was the only modification made to 2 items. These findings add to the evidence on the value of visually enhanced tools to improve data accuracy by eliciting item clarity and comprehension [28, 30]. Moreover, visually enhanced tools appear particularly valuable when evaluating food-related behaviors among cultural and linguistic minorities. For instance, most of the improvements needed in the appropriateness domain were achieved by replacing the visual depiction of an unfamiliar practice with one reflecting a common practice to respondents. A noteworthy example is a revision of accompanying visuals to reflect culturally relevant practices in the item "I plan meals," where checking out coupons was deemed a more suitable visual example than portioning meat. Evidence on the use of food-on-sale advertisements or coupons as a favored planning strategy over the creation of a shopping list by Spanish-speaking parents is lacking in the literature; however, it is consistent with what others have found among low-income families [51, 52]. The visual example of vegetables arranged on a plate as a smiley face, deemed suitable by most but not all respondents, was only minimally modified in favor of retaining equivalence with the MCMT and CFSQ. The same example presented in the text form was deemed irrelevant by respondents in a study on the adaptation of the CFSQ for Brazilian parents [53]. Future studies must further explore the appropriateness of this particular example to represent positive eating encouragement in non–English-speaking populations.

Improving semantic appropriateness involved making changes to items containing the words "treat" and "snack." Neither noun has a unique morphologic equivalent in Spanish. The wide range of foods and eating occasions involved in determining snack consumption poses limitations to its assessment [54]. The plethora of Spanish words for "snack" [55] compounds these limitations, making it a particularly challenging term to translate. This is especially true for tools such as Mi Niño, for which brevity is recommended because it is intended for respondents with a wide range of literacy levels. Given these considerations and the crucial fact that its meaning was well understood across respondents, it was decided to leave the word "snack" untranslated. The visual examples in this item helped to improve comprehension. This further supports the value of using visual aids to enhance the comprehension of items to measure concepts subject to multiple interpretations.

Results from response distributions and the factor structure lend further evidence for equivalence of interpretation of Mi Niño items to their English version. Results indicate that participants distinguished between the response options and that their responses across the items were consistent. The resulting 2-factor structure and their item compositions found for Mi Niño is consistent with that of the English version (MCMT) [28]. These resulting factors comprise items that measure child-centered strategies [e.g., "*Hago que mi niño(a) coma explicándole que la comida le hace bien*"] and parent-centered strategies [e.g., "*Le digo a mi niño(a), 'Apúrate y come tu comida'*"]. These 2 "higher-order" constructs capture a range of critical food-related parenting practices identified as significant predictors of children's dietary behaviors in English- and Spanish-speaking families [56, 57]. The ability to reliably and efficiently capture culturally aligned self-assessments of these constructs in Spanish speakers is critical for community-based interventions that focus programming on these associated behaviors.

The resulting assessment tool increases the evaluation capacity of researchers and practitioners by offering a convenient way to assess food-related parenting styles with ethnically diverse, low-income participants. The use of visuals in Mi Niño and MCMT allows for complex questions to be posed with significantly reduced literacy demands, improving the accuracy of the data collected by decreasing the amount of effort and time respondents must take to process their answers.

Strengths of this study include the systematic approach applied to tool adaptation that engaged both target respondents and content experts in an iterative process and the use of quantitative methods to establish internal consistency equivalence. However, there are limitations to this study. Participants in both validation phases of this study (i.e., face validity, confirmatory factor analysis, and internal consistency reliability) were women of Mexican or Central American origin with low income, which limits the generalizability of the results and the usefulness of the adapted tool to low-income Spanish-speaking parents and caregivers from other countries of origin and socioeconomic status. Because study participants were a convenience sample of volunteers, selection bias may further affect the external validity of the study. Adaptation of MCMT to other cultural and linguistic groups beyond Spanish speakers is warranted.

Face validity of Mi Niño and its semantic and internal consistency equivalence with MCMT were established. The next steps include exploring the correspondence of the parent- and child-centered behaviors represented in Mi Nino with mealtime behaviors observed through video recordings. This tool can identify food-related parenting practices to address in community programs or interventions involving Spanish-speaking families with young children. In addition, educators, counselors, and health providers can use the tool to assist caregivers in setting behavioral goals using results generated through the website, healthykids.ucdavis.edu.

Data Availability

The data described in the manuscript may be made available on request pending approval from all authors and funding support source.

Author disclosures

The authors report no conflicts of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.cdnut.2022.100002.

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